

इंटरनेट

मानक

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“जानने का अधिकार, जीने का अधिकार”

Mazdoor Kisan Shakti Sangathan

“The Right to Information, The Right to Live”

“पुराने को छोड़ नये के तरफ”

Jawaharlal Nehru

“Step Out From the Old to the New”

IS 12218 (1987): Method of Measurement of Approach, Departure and Ramp Angles of Automotive Vehicles [TED 4: Automotive Braking Systems]



“ज्ञान से एक नये भारत का निर्माण”

Satyanarayan Gangaram Pitroda

“Invent a New India Using Knowledge”



“ज्ञान एक ऐसा खजाना है जो कभी चुराया नहीं जा सकता है”

Bhartrhari—Nitiśatakam

“Knowledge is such a treasure which cannot be stolen”

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Indian Standard

METHOD OF MEASUREMENT OF APPROACH, DEPARTURE AND RAMP ANGLES OF AUTOMOTIVE VEHICLES

1. Scope — Gives the method of measurement of approach, departure and ramp angles of cars, jeeps, trucks and buses.

2. Terms and Definitions — For terms and definitions used in this standard reference shall be made to IS : 9435-1980 'Terms and definitions relating to dimensions of road vehicles'.

3. Features of Test Track — Shall be a plane level and hard ground.

4. Preparation of Vehicles

4.1 The vehicle shall conform in all parts, components and sub-systems to the design and/or production series as applicable.

4.2 The vehicle shall be loaded to the specified maximum manufacturer's total weight and load distribution between the axles shall be as per the manufacturer's recommendation.

4.3 The vehicle shall be fitted with tyres which shall have a tread depth of not less than 90 percent of tread depth on new tyre. The tyres shall be inflated to the pressure recommended by the manufacturer.

4.4 The vehicle shall be parked on the test track in such a way that all its wheels are resting on the same horizontal plane. The engine shall be switched off and parking brake applied. The wheels shall be pointing towards the straight ahead condition.

5. Measurements

5.1 Approach Angle — The distance along the longitudinal axis to the least favourably placed point in front of the front axle from the centre line of the front axle (shown as X_A in Fig. 1) and the height from the ground (shown as Y_A in Fig. 1) shall be established to the nearest millimetre.

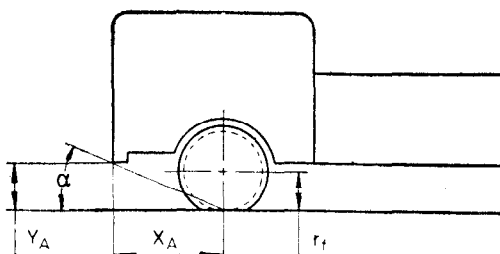


FIG. 1 APPROACH ANGLE

The least favourably placed points which shall not include the number plate may be chosen by visual judgement and in case of doubt, measurements may be done for the various possible points and the smallest angle may be reported.

The approach angle shall be calculated as:

$$\alpha = \sin^{-1} \frac{r_t}{\sqrt{X_A^2 + (r_t - Y_A)^2}} - \tan^{-1} \frac{r_t - Y_A}{X_A}$$

where X_A and Y_A are as explained above, and

r_t = static rolling radius of the front tyre.

The approach angle shall be expressed in degrees, rounded off to the nearest half degree. An approach angle not less than 12° is recommended.

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5.2 Departure Angle — The distance along the longitudinal axis to the least favourably placed point in the rear of the rearmost axle from centre line of the rearmost axle (shown as X_D in Fig. 2) and its height from the ground (shown as Y_D in Fig. 2) shall be established to the nearest millimetre.

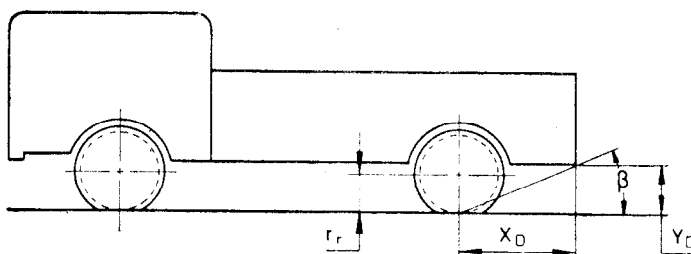


FIG. 2 DEPARTURE ANGLE

The least favourably placed point which shall not include the number plate may be chosen by visual judgement and in case of doubt, measurements may be made for various doubtful points and the smallest angle may be reported.

The departure angle β shall be calculated as:

$$\beta = \sin^{-1} \frac{r_r}{\sqrt{X_D^2 + (r_r - Y_D)^2}} - \tan^{-1} \frac{r_r - Y_D}{X_D}$$

where X_D and Y_D are as explained above, and

r_r = static rolling radius of the rear tyre.

The departure angle shall be expressed in degrees, rounded off to the nearest half degree. A departure angle not less than 10° is recommended.

5.3 Ramp Angle — The distance along the longitudinal axis to the least favourably placed point in between the front axle and rear axle (intermediate axle in the case of three axled vehicles) from the centre line of the front and rear axles (shown as X_{Rf} , X_{Rr} and Y_R respectively in Fig. 3) and its height from the ground Y_R shall be established to the nearest millimetre.

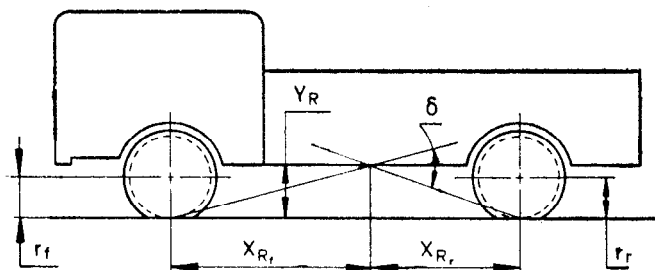


FIG. 3 RAMP ANGLE

The least favourably placed point may be chosen by visual judgement and in case of doubt, measurements may be made for various points and the smallest angle may be reported.

The ramp angle shall be calculated as:

$$\delta = \sin^{-1} \frac{r_f}{\sqrt{X_{Rf}^2 + (r_f - Y_R)^2}} - \tan^{-1} \frac{r_f - Y_R}{X_{Rf}} + \sin^{-1} \frac{r_r}{\sqrt{X_{Rr}^2 + (r_r - Y_R)^2}} - \tan^{-1} \frac{r_r - Y_R}{X_{Rr}}$$

The ramp angle shall be expressed in degrees and rounded off to the nearest half degree. A ramp angle not less than 15° is recommended.

EXPLANATORY NOTE

The overall performance of vehicle is a function of performance of its various components, systems, instrumentation, etc. This standard gives a uniform method for measurement of the approach departure and ramp angles.